

Valles Caldera National Preserve

Sandoval County

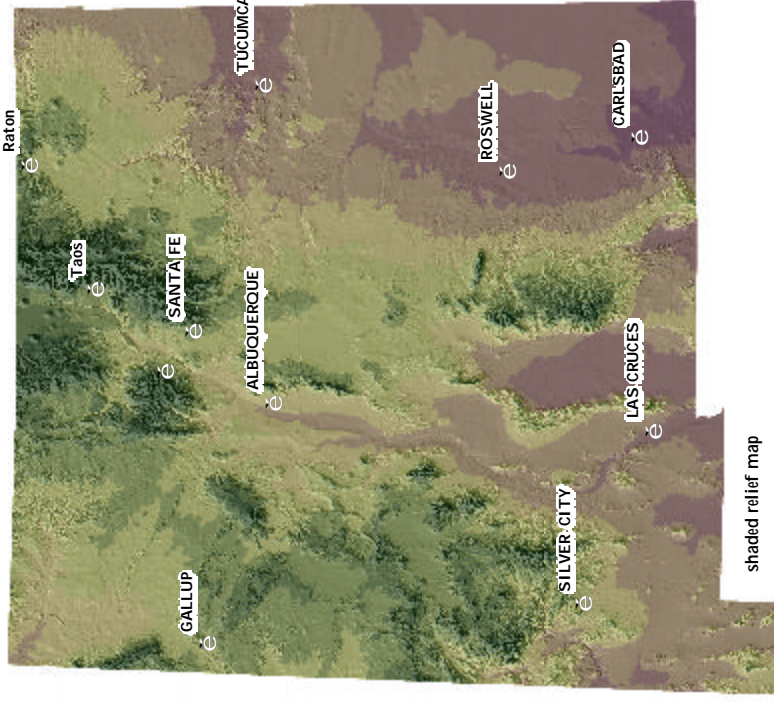
New Mexico

Stewardship Register

Valle Toledo Prescribed Fire

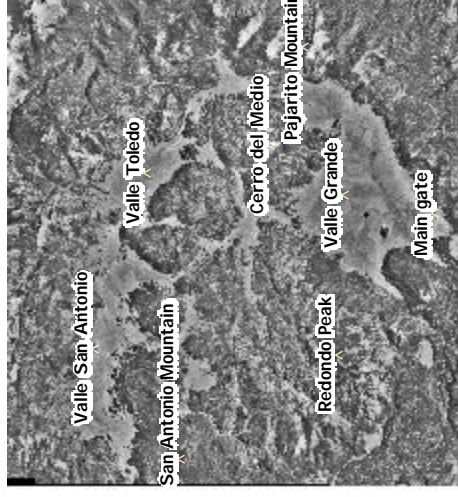
<u>Stewardship Action:</u>	Valle Toledo Prescribed Fire
<u>File Number:</u>	
<u>Target Start Date:</u>	Fall 2005
<u>Actual Start Date:</u>	
<u>Target Completion Date:</u>	Fall 2005
<u>Actual Completion Date:</u>	
<u>Location (approximate project center):</u>	Latitude/Longitude: 35.9625°N, 106.4625°W Legal description: New Mexico, New Mexico Meridian T20N, R4E, Section13 UTM: zone 13 (X,Y) 368122 , 3980778

State of New Mexico



Valle Toledo
Prescribed Fire
Area

Valles Caldera National Preserve
www.vallescaldera.gov



Valle Toledo Prescribed Fire - Vicinity Map

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Introduction

Fire has played a determining role in the ecosystems of the Jemez Mountains since the last climatic change (Allen, 1989). The frequency, season, duration, and intensity of lighting-caused fires (the *fire regime*) has determined the structure (age, size, and distribution of plants), composition (plant species and associations), and function (processes such as erosion and carbon cycling) of these ecosystems. By examining the growth rings from trees surrounding the valleys on the Valles Caldera National Preserve, it has been estimated that fires burned through these montane grasslands at a frequency of 9-11 years.

These fires affected the structure of the grasses by consuming older, larger stems, and litter accumulations allowing sunlight and moisture to penetrate to the base of the plant. This stimulated tillering (the sprouting of new stems from the base of the plant); thus replacing the older, larger stems with younger, more vigorous plants. Fire further influenced the structure of the plant community by killing conifer seedlings trying to establish in the open grasslands and exposing soil, providing an opportunity for seeds from the bunchgrasses to germinate. The frequent return of fire favored a plant composition of fire adapted species such as the bunchgrasses.

The natural fire regime on the Preserve and elsewhere in the Jemez Mountains was disrupted with the arrival of Europeans and their livestock. Cattle and sheep grazed the grasses eliminating the fuels necessary to spread the fires. They also created infrastructure including roads and trails, which served as defacto fire breaks. Finally, they organized to suppress fires in a natural desire to protect their homes, families, and the natural resources they relied on. Fire was all but eliminated from the Jemez Mountains and the Preserve in the late 1700's to early 1800's. With the exception of some modest uses of prescribed fire, the ecosystems of the Preserve have evolved without fire since that period.

Just as fire determined and influenced the structure, composition, and function of these ecosystems, the lack of fire has had an equally profound effect. Larger, older stems and heavy accumulations of litter dominate the bunchgrasses; reproduction of the plants through both tillering and seed dispersal has been stifled. Conifer trees have progressively established into the open grasslands contributing further to the litter accumulations. The increase in litter and changes in the plant structure would allow a fire burning during the "natural" summer season to burn with a greater intensity¹ and severity² than historic fires.

The role of fire in the ecosystems of the Jemez Mountains and throughout the western United States has been well documented, as has the need to restore the structure and composition of our forests and rangelands as well as the need to reintroduce fire as a beneficial process. This goal is reflected in the Federal Wildland Fire Policy, adopted by all federal land managers including the Valles Caldera Trust.

¹ "Intensity" refers to the rate at which a fire spreads and the amount and duration of energy or heat produced by the fire.

² "Severity" is a measure of the downward flux of heat from a fire. Fire severity largely determines the fire's effect to ecosystem function.

Purpose and Need

This stewardship action is being proposed to determine both the effects and the effectiveness of using fire to improve the health and vigor of grassland communities on the Preserve as well as to estimate the interactions of fire with the grazing activities of both cattle and elk.

Over the last decade the use of prescribed fire to restore the “natural” structure, composition and function of forest and rangeland ecosystems has increased on public lands. Some well-documented studies, especially in ponderosa pine forests, have been completed to provide land managers with resources for the development of sound prescriptions for prescribed fire and mechanical restoration treatments. However, the uses of fire on the Preserve while under private ownership have not been quantitatively monitored or documented. The use of fire on montane grasslands has and is occurring elsewhere with associated monitoring. Existing information can allow us to reasonably predict the significance and range of effects likely to occur as a result of using fire in our grasslands. However, before we consider a comprehensive program for the use of fire on the Preserve, we believe there is a need to conduct a carefully monitored prescribed fire within a grassland ecotype.

A suite of short- and mid-term outcomes have been selected for systematic evaluation of the proposed stewardship action:

- Plant community, composition, and productivity;
- Plant population demographics;
- Plant and soil nutrient dynamics;
- Litter decomposition;
- Soil erosion;
- Elk and cattle foraging behavior;
- Terrestrial arthropod communities;
- Stream water quality;
- Aquatic macroinvertebrates;
- Fish communities;
- *In situ* archaeological artifacts;
- Smoke production and dispersal.

The study design has been submitted to and funding has been approved by the United States Forest Service Rocky Mountain Research Station.

The derived data would be synthesized to measure the effects and effectiveness of the use of prescribed fire for improving the vigor and distribution of bunchgrasses and reducing the encroachment of conifer seedlings into the grasslands. This will contribute to developing effective prescriptions and performance requirements for future applications of prescribed fire on the Preserve. This information will also be applicable to the use of prescribed fire in other montane grassland ecotypes.

Proposed Action

The Valles Caldera Trust is proposing to conduct a carefully monitored Prescribed Fire on about 1800 acres of the 3800-acre Valle Toledo. The Valle Toledo is being proposed as the most suitable site to conduct the burn for several reasons:

- It is adjacent to two perennial streams, which afford the Trust the opportunity to establish a control area along one stream in order to test the effectiveness of specific performance requirements in protecting streams from potential negative indirect effects of fire such as sedimentation deposits resulting from post fire erosion.
- Large diameter stems dominate the bunchgrasses in the Valle. This is an indication that an excessive litter accumulation is limiting tillering at the base of the plant.
- The Valle is used in our grazing operation. Previous year's monitoring information exists for both cattle and elk use patterns prior to using prescribed fire.
- The open roads and favorable topography of the Valle are logistically ideal for reducing risks associated with prescribed fire.
- These same features greatly reduce the logistics associated with accessing the project area to implement and monitor the complex array of data locations over a multiple year period.
- Previous surveys completed in the area as well as a sample survey conducted for the purpose of planning this stewardship action indicate abundant lithic artifacts are distributed throughout the Valle.

The prescribed fire would be implemented over a 3-5 day period in the fall using both hand and aerial ignition techniques. The ignition would be adjusted based on the actual wind, temperature and humidity at the time of ignition. By adjusting the ignition of the fire we are proposing to have fire spread uniformly through the bunchgrass communities treating as much as 70% of this ecotype. The ignition would be adjusted in both pattern and timing to reduce the continuity of fire through the riparian grassland ecotypes, reducing any potential affect to the San Antonio Creek. Fire will be kept out of the Rito de los Indios to serve as a control to allow us to measure the effectiveness of our ignition techniques. Keeping fire from the Rito de los Indios also eliminates the potential for fire near both streams to cumulatively affect the watershed further downstream.

The monitoring would be implemented before and after the fire as required using non-ground disturbing techniques for sampling.

The prescribed fire will be implemented under the direction of the Fire Management Staff of the Santa Fe National Forest. All personnel participating in the prescribed fire will be fully qualified by the National Wildfire Coordination Group *Wildland and Prescribed Fire Qualifications Systems Guide* PMS 310-1. The burn will be conducted in accordance with NMAC 20.2.65 Smoke Management. The objective of this part (65) is to manage the air quality impacts of smoke from all sources of fire in the State of New Mexico.